

CLAIMS

1. An organic thin-film transistor having an organic semiconductor layer, characterized in that the 5 organic semiconductor layer comprises a fluorinated acene compound which is represented by a formula of $C_{4n+2}F_{2n+4}$, wherein n is an integer of 2 or greater.

2. An organic thin-film transistor comprising a 10 gate electrode, a source electrode, a drain electrode, a gate insulating film, and an organic semiconductor layer, characterized in that the organic semiconductor layer comprises a fluorinated acene compound which is represented by a formula of $C_{4n+2}F_{2n+4}$, wherein n is an 15 integer of 2 or greater.

3. The organic thin-film transistor as claimed in claim 1 or 2, characterized in that plural molecules of the fluorinated acene compound are oriented so that 20 molecular axes of the molecules are approximately parallel to each other and a normal direction of a molecular plane of the molecule approximately corresponds to a direction of electric current flowing in the organic semiconductor layer.

25 4. The organic thin-film transistor as claimed in any of claims 1 through 3, characterized in that the fluorinated acene compound is tetradecafluoropentacene.

30 5. The organic thin-film transistor as claimed in any of claims 1 through 3, characterized in that the fluorinated acene compound is dodecafluoronaphthacene.

6. A method of fabricating an organic thin-film transistor having a substrate and an organic semiconductor layer, characterized in that the organic semiconductor layer is formed by controlling temperature of the
5 substrate to 30 °C or higher and 65 °C or lower and vacuum-depositing tetradecafluoropentacene on the substrate.

7. A method of fabricating an organic thin-film transistor having a substrate and an organic semiconductor layer, characterized in that the organic semiconductor layer is formed by controlling temperature of the
10 substrate to 24 °C or higher and 60 °C or lower and vacuum-depositing dodecafluoronaphthacene on the substrate.

15 8. An organic thin-film device characterized by comprising an organic thin-film transistor as claimed in any of claims 1 through 5.

9. The organic thin-film device as claimed in
20 claim 8, characterized by comprising the organic thin-film transistor which constitutes an n-type thin-film transistor and a p-type thin-film transistor.

10. The organic thin-film device as claimed in
25 claim 9, characterized in that the p-type thin-film transistor has an organic semiconductor layer which comprises pentacene.